

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/B2004/000164

International filing date (day/month/year)
22.01.2004

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC
H03D7/14

Applicant
NOKIA CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/000164

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/000164

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)

International application No.

PCT/IB2004/000164

Re Item V.

1. The following documents are referred to in this communication:

D1 : US 2003/129958 A1 (BEHZAD ARYA REZA) 10 July 2003 (2003-07-10)

D2 : EP 0 410 295 A (MOTOROLA INC) 30 January 1991 (1991-01-30)

D3: KASSIM A K ET AL: "Tail current flicker noise reduction in LC VCOs by complementary switched biasing" ICM 2003, 9 December 2003 (2003-12-09), pages 102-105, XP010697431 CAIRO, EGYPT

D4: US-A-4 392 112 (SCHADE JR OTTO H) 5 July 1983 (1983-07-05)

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claims 1 to 11 does not involve an inventive step in the sense of Article 33(3)PCT.

3.1 Document D1, which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses (the references in parenthesis applying to this document):

Mixer circuit (50) comprising:

- a down-conversion mixing component arranged for down-converting an input radio frequency signal (18); and
- an active mixer load circuit (56, 58, 60) connected to the output terminals of said down-conversion mixing component, wherein said active mixer load circuit () includes an active mixer load.

3.2 The subject-matter of independent claim 1 differs from the disclosure of D1 in that it further discloses:

modulating means arranged for modulating a flicker noise produced by said active mixer load away from the signal band output by said down-conversion mixing component.

3.3 The problem to be solved by the present invention may therefore be regarded as the removal of flicker noise generated by the active load, from the output signal of the mixer.

3.4 In view of D2 the solution proposed in claim 1 of the present application cannot be

considered as involving an inventive step (Article 33(3) PCT). The reasons are as follows:

D1, paragraph 0005, indicates that the problem with flicker noise is known, and resolves it by selecting transistors for the active load which have a larger channel width than would normally be applied (see paragraph 0020). The application indicates that the mixer of claim 1 is to be implemented in deep sub-micron technology, which reduces the effectiveness of the solution proposed in D1. The skilled person would therefore be required to seek another solution to the problem of removing flicker noise from such a Gilbert-cell mixer configuration.

The documents D2, D3 and D4 all propose similar solutions to this problem, for differing differential circuits. The principle of applying a switching, averaging process (also known as chopper stabilization) is proposed in these documents, directed specifically towards solving the problem of flicker noise which is generated by the circuit. Such switching is recognisable to the skilled person as being equivalent to a modulation process, as it is called in claim 1. The skilled person, when reading any of these documents, would immediately recognise any one of them as a solution to the objective problem of claim 1, and would apply their teaching to the circuit of D1 without the exercise of any inventive skill, resulting in a circuit according to claim 1, which solves the problem of flicker noise generation in the active load. For the purposes of this examination, it is considered that D2 is the best candidate for combination with D1, as it shows very clearly how such a switch can be implemented.

3.5 The proposed solution in independent claim 1 thus cannot be considered inventive (Article 33(3) PCT).

4. The additional feature of dependent claim 2, the modulating means includes a plurality of switching elements, is known explicitly from D2, figure 1, elements S3-S6. The subject-matter of claim 2 is therefore not inventive.

5. The additional feature of claim 3, relating to the operational amplifier with a common-mode voltage reference, and its mode of operation, is known from D1, figure 6, component 52, common mode circuit. This circuit already exists in D1 to perform its function of reducing common-mode offsets (see D1 paragraphs 0029 and 0030), and its counterpart in the present application performs the same function. In neither document is this circuit described as contributing to the problem posed. In the

application it is included in the description (page 15 lines 1 - 8) only when describing the circuit layout. Thus, as the additional feature of claim 3 is already known from D1, and it does not contribute to solving any problem, the subject-matter of claim 3 is not inventive.

6. The additional features of claims 4 and 5 refer to implementing the present system in a current or voltage modes. This is a simple matter of choice of implementation, which does not imply or involve any inventive activity on the part of the skilled person.

7. The additional features of dependent claims 6 to 10 also refer to straightforward implementations or realisations of the present system, none of which involve solving any problem. Therefore none of these claims contain inventive subject-matter.

8. The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 11 does not involve an inventive step in the sense of Article 33(3)PCT. The features of independent claim 11 correspond exactly to those of the apparatus claim of claim 1. As it has been demonstrated that the subject-matter of claim 1 is not inventive, the subject-matter of claim 11 is, for the same reasons, also not inventive.